Semester: Fall 2017
Course Number: 10:832:335 Section 80
Course Title: Epidemiology (Hybrid)
Course Day and Time: Thursday 4:30 PM – 5:50 PM
Location: Brookdale Community College Freehold Campus Room 208
3680 Route 9 South, Freehold, NJ 07728
Course Instructor: Brett Nance, MPH
Contact Information: Cell Phone: 908-670-1109 (call or text)
Email: Ban59@sph.rutgers.edu
When you email me, please specify “Epi Course” in the subject
Office Hours and Location: Tuesdays 5:00 PM – 7:00 PM in Room 204 and Thursdays after class
Please make an appointment via email

Note: See erratum sheet correcting a formula that appears on page 130. The correct formula should read: Specificity: d/b+d

Course Description:
Study the principles and methods of epidemiology; the study of the distribution (patterns of occurrence) and determinants (causes) of disease and injury in human populations.

Public Health Learning Goals:
Students Will:
1. Think critically in public health
2. Effectively communicate public health information
3. Develop, apply, and analyze concepts from research methods and basic statistics
4. Utilize information literacy skills in public health
5. Understand the role and importance of professional development
6. Understand and apply professional skills
Core Competencies Addressed¹

1.a. Public Health History
1.b. Public Health Philosophy
1.c. Core PH Value
1.d. Core PH concepts
1.e. Global Functions of Public Health
1.f. Societal Functions of Public Health
2.a. Basic Concepts of Data Collection
2.b. Basic Methods of Data Collection
2.c. Basic Tools of Data Collection
2.d. Data Usage
2.e. Data Analysis
2.f. Evidence-based approaches
3.a. Population Health Concepts
3.b. Introduction to Processes and Approaches to Identify Needs and Concerns of Populations
3.c. Introduction to Approaches and Interventions to Address Needs and Concerns of Populations
4.a. Science of Human Health and Disease
5.a. Socioeconomic Impacts on Human Health and Health Disparities
5.b. Behavioral Factor Impacts on Human Health and Health Disparities
5.c. Biological Factor Impacts on Human Health and Health Disparities
5.d. Environmental Factor Impacts on Human Health and Health Disparities

This course is on Canvas. Help is available 24/7. Call 877-561-1134 or email help@canvas.rutgers.edu

Course Overview:

This course covers the principles and methods of epidemiology, the study of the distribution and determinants of disease and injury in human populations. Upon completion of this course, students will have an understanding of common study designs, be able to calculate typical outcome measures, and be able to critically read public health literature and evaluate the results of epidemiological studies.

Method of Instruction:

This class is a hybrid, which means that we meet for only one 80-minute class session per week. You are expected to spend time each week learning the material in addition to what you’d normally expect to do for homework. Typically, we will start a lecture during our weekly meeting time and you’ll finish it after the class ends. Most weeks I’ll give you examples that illustrate the main idea rather than present the lecture notes, so be sure to bring the PowerPoint slides with you to class. Because it’s a hybrid, there’s a bit more testing to make sure you’re keeping up with the material.

¹ As required by the Council of Education in Public Health (CEPH) for accreditation of undergraduate programs in public health.
## Course Outline by Week

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>In class Lecture &amp; Exam Schedule</th>
<th>Homework</th>
<th>Suggested Readings</th>
</tr>
</thead>
</table>
| Week 1 | September 7<sup>th</sup> | • **In class:**  
  o Review syllabus & hybrid class setup  
  o Start Lecture 1: Scope and History of Epidemiology  
  • **Key Topics:**  
  Overview of Epidemiology; Rise of epi in history, Important figure (John Snow) | • **Homework:**  
  o Finish & review Lecture 1 by next class  
  o Complete Syllabus Review Quiz (10 points) by 11:59 PM on Thursday 9/14 | • Chapter 1: Laying the Foundations  
  • Chapter 2: Threads of Epidemiologic History |
| Week 2 | September 14<sup>th</sup> | • **In class:**  
  o Sign up for an MMWR presentation date  
  o Start Lecture 2: Basic Outcome Measures  
  • **Key Topics:**  
  Counts, ratios, proportion and rates; Crude rates (mortality rate); Proportional Mortality Ratio vs. cause specific mortality rate; Incidence vs. prevalence; Risk vs. rate | • **Homework:**  
  o Finish & review Lecture 1 & Lecture 2 for next class  
  o Online questions on Lectures 1 & 2 (7 points) completed by 11:59 PM on Thursday 9/21 | • Chapter 3: Selected Epidemiologic Concepts |
| Week 3 | September 21<sup>st</sup> | • **In class:**  
  o Quiz on Lectures 1 & 2: Basic Outcome Measures (7 points)  
  o MMWR Presentation  
  o Start Lecture 3: Inferring Cause and Preventing Disease  
  • **Key Topics:**  
  Inductive vs. deductive science; Models of causality (Epi triad, causal pies, Hill’s criteria); Primary, secondary, tertiary prevention; natural history of disease | • **Homework:**  
  o Finish & review Lecture 3 for next class  
  o Online questions on Lecture 3 (7 points) completed by 11:59 PM on Thursday 9/28 | • Chapter 4: Inferring Causal Relationships |
<table>
<thead>
<tr>
<th>Week 4</th>
<th>September 28th</th>
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<tbody>
<tr>
<td><strong>In class:</strong></td>
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<tr>
<td>o Quiz on Lecture 3: Inferring Cause and Preventing Disease (7 points)</td>
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<tr>
<td>o MMRW Presentation</td>
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<tr>
<td>o Start Lecture 4: Rates</td>
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<tr>
<td><strong>Key Topics:</strong></td>
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<tr>
<td>Calculating and interpreting crude vs. specific (stratified) vs. directly adjusted (standardized) rates; Age as a confounder</td>
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<tr>
<td><strong>Homework:</strong></td>
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<tr>
<td>o Finish &amp; review Lecture 4</td>
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<tr>
<td>o Online questions on Lecture 4 (7 points) completed by 11:59 PM on Thursday 10/5</td>
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<tr>
<td><strong>Chapter 5</strong></td>
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<tr>
<td>Vital Statistics</td>
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<tr>
<td><strong>Chapter 6</strong></td>
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<tr>
<td>Using Vital Statistics</td>
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<tr>
<th>Week 5</th>
<th>October 5th</th>
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<tbody>
<tr>
<td><strong>In class:</strong></td>
<td></td>
</tr>
<tr>
<td>o Quiz on Lecture 4: Working with Rates (7 points)</td>
<td></td>
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<tr>
<td>o MMRW Presentation</td>
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<tr>
<td>o Start Lecture 5: Screening</td>
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<tr>
<td><strong>Key Topics:</strong></td>
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<tr>
<td>Characteristics and requirements for screening tests; Basic measures (sensitivity, specificity); Efficiency vs. efficacy; Prevalence and positive and negative predictive values</td>
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<tr>
<td><strong>Homework:</strong></td>
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<tr>
<td>o Finish &amp; review Lecture 5 for next class</td>
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<tr>
<td>o Online questions on Lecture 5 (7 points) completed by 11:59 PM on Thursday 10/12</td>
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<tr>
<td><strong>Chapter 13</strong></td>
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<tr>
<td>Clinical Applications</td>
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<tr>
<th>Week 6</th>
<th>October 12th</th>
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<tbody>
<tr>
<td><strong>In class:</strong></td>
<td></td>
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<tr>
<td>o Quiz on Lecture 5: Screening (7 points)</td>
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<tr>
<td>o MMRW Presentation</td>
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<tr>
<td>o Start Lecture 6: Data Sources</td>
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<tr>
<td><strong>Key Topics:</strong></td>
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<tr>
<td>Criteria used to consider the quality and value of epidemiologic data; Types of data sources; Data limitations; PHI and HIPPA; Key reports such as <em>Health US and Healthy People</em></td>
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<tr>
<td><strong>Homework:</strong></td>
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<tr>
<td>o Finish &amp; review Lecture 6</td>
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<tr>
<td>o Online questions on Lecture 6 (7 points) completed by 11:59 PM on Thursday 10/19</td>
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<tr>
<td>o <strong>STUDY FOR EXAM 1 (Study guide will be posted)</strong></td>
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<tr>
<td><strong>Chapter 7:</strong></td>
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<tr>
<td>Morbidity Statistics</td>
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<tr>
<th>Week 7</th>
<th>October 19th</th>
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<tr>
<td><strong>EXAM 1 IN CLASS ON LECTURES 1-6 BEGINNING AT 4:00 PM (140 POINTS)</strong></td>
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<tr>
<td><strong>SHORT ANSWER ESSAY QUESTIONS FOR EXAM 1 ON CANVAS (25 POINTS) AVAILABLE ON 10/19 AND DUE BY 11:59 ON 10/25</strong></td>
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## Week 8 
**October 26th**

- **In Class:**
  - Start Lecture 7: Intro to Study Designs & Descriptive Epi
  - MMWR Presentation
- **Key Topics:**
  - Study design overview and basic characteristics; Scientific hypotheses; Two by Two tables; Descriptive designs (case reports, Ecologic, cross sectional studies); Descriptive epidemiology (characteristics of person, place, and time)

- **Homework**
  - Finish & review Lecture 7
  - Online questions on Lecture 7 (7 points) completed by 11:59 PM on Thursday 11/2

- **Chapter 8:**
  - Using morbidity statistics

## Week 9 
**November 2nd**

- **In class:**
  - Quiz on Lecture 7: Intro to Study Designs & Descriptive Epi (7 points)
  - MMWR presentation
  - Start Lecture 8: Case Control Studies
- **Key topics:**
  - Overview of design including selection of controls, recall bias, advantages and disadvantages, calculation and interpretation of Odds Ratio; Applications and examples of case control studies; P values and Confidence intervals; Clinical vs. statistical significance

- **Homework**
  - Finish & review Lecture 8
  - Online questions on Lecture 8 (7 points) completed by 11:59 PM on Thursday 11/9

- **Chapter 10:**
  - Observational studies; case-control studies

## Week 10 
**November 9th**

- **In class:**
  - Quiz on Lecture 8: Case Control Studies (7 points)
  - MMWR presentation
  - Start Lecture 9: Cohort Studies
- **Key topics:**
  - Overview of design including subtypes, common biases, advantages and disadvantages, calculation and interpretation of Risk Ratio; Applications and

- **Homework**
  - Finish & review Lecture 9 for next class
  - Online questions on Lecture 9 (7 points) completed by 11:59 PM on Thursday 11/16

- **Chapter 9:**
  - Observational studies: cohort studies
### Week 11
**November 16th**

- **In class:**
  - Quiz on Lecture 9: Cohort Studies (7 points)
  - MMWR presentation
  - Start Lecture 10: Experimental designs & data interpretation issues
- **Key Topics:**
  - Overview of design, especially RCT and variants (cross over and factorial);
  - Control of bias; Ethical and practical limitations; Internal vs. external validity; Systemic vs. random error

- **Homework:**
  - Finish & review Lecture 10 for next class
  - Online questions on Lecture 10 (7 points) completed by 11:59 PM on Sunday 11/23

- **Chapter 11:** Experimental studies: randomized controlled trials

- **Chapter 12:** Experimental studies: community and cluster randomized trials

### Week 12
**TUESDAY November 21st**

- **In class:**
  - Quiz on Lecture 10: Experimental designs & data interpretation issues (7 points)
  - Start Lecture 11: Infectious Disease Epidemiology
- **Key Topics:**
  - Chain of infection; Infectivity; pathogenicity and virulence;
  - Direct vs. indirect transmission; Outbreak investigation basics and measures including epicurves and attack rates

- **Homework:**
  - Finish & review Lectures 11
  - Online questions on Lectures 11 (7 points) completed by 11:59 PM on Thursday 11/30

- **Chapter 14:** Field Epidemiology

- **Review Chapter 3**
  - Selected epidemiologic concepts

### Week 13
**November 30th**

- **In class:**
  - Quiz on Lecture 10: Infectious Disease Epidemiology (7 points)
  - In-class practice problems and exercises
Course Assessment

The following assignments will assess learning goals. Additional information on specific assignments is described below or will become available on our Canvas website.

Think critically in public health

Example: Weekly in class quizzes, online homework questions, and exams work to increase comprehension.

Effectively communicate public health information

Example: Students will prepare a short presentation on an article selected from the Centers for Disease Control and Prevention Morbidity and Mortality Weekly Report (MMWR). Students will also respond to short essay questions as part of their exams.

Develop, apply, and analyze concepts from research methods and basic statistics

Example: Students will learn about various study designs. Additionally, several class lessons and exercises are geared to develop this learning outcome.

Utilize information literacy skills in public health

Example: Students will conduct research for the MMWR presentation and short essay questions for the exam.

Understand the role and importance of professional development

Example: Professional writing and communication is assessed with the MMWR presentation and timed exams.

Understand and apply professional ethics

Example: Many weekly topics include controversial subjects. Students are also asked to understand and apply professional ethics on exams. The ethics associated with using human subjects for medical research is discussed and tested upon.
Course grading:

The course is based on a total of 500 points, as follows:

- Two timed online exams, each worth 140 points = 280 points total
- Two short response exam questions, each worth 25 points = 50 points total
- Online syllabus review quiz (untimed) = 10 points
- Ten in-class quizzes worth 7 points each = 70 points total
- Ten online untimed homework assignments worth 7 points each = 70 points total
- MMWR presentation = 20 points

Grading is based on the timely and correct submission of all assignments, and both in class and online participation.

Final Grade Cut-points:

I round up to the next grade when you are within 0.5 points of the next cut-point.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Score Range</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>460 to 500 points</td>
<td>(92 – 100 %)</td>
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<tr>
<td>B+</td>
<td>430 to 459.9 points</td>
<td>(86 – 91.9 %)</td>
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<tr>
<td>B</td>
<td>400 to 429.9 points</td>
<td>(80 – 85.9 %)</td>
</tr>
<tr>
<td>C+</td>
<td>380 to 399.9 points</td>
<td>(76 – 79.9 %)</td>
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<tr>
<td>C</td>
<td>350 to 379.9 points</td>
<td>(70 – 75.9%)</td>
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<tr>
<td>D</td>
<td>300 to 349.9 points</td>
<td>(60 – 69.9 %)</td>
</tr>
<tr>
<td>F</td>
<td>299.9 or less points</td>
<td>(59.9 % or lower)</td>
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Guidelines for Assignments and Projects:

Students are expected to work independently on timed exams and in class quizzes. Failure to do so will be considered a violation of Rutgers’ Academic Integrity Policy (See below for details).

This class is a hybrid, which means that we meet for only one class session per week. You are expected to do additional work outside of our class meeting time learning the lectures in addition to what you’d normally expect to spend on homework. The class is divided into two parts, each covering six lectures with accompanying in-class quizzes and online homework. In addition, a timed exam on Part 1 and Part II of the course is administered online, in conjunction with some untimed short reply questions. In general, my emphasis is on the lecture notes and any additional in-class activities.

Syllabus Review Quiz (10 points)

A short, untimed quiz on the syllabus will be administered online during the first week of class. This is to ensure students understand important deadlines and other requirements.
**Timed Exams (2 @ 140 points, 280 points total)**

Two **timed** exams will be given in class and need to be completed within the time window assigned (typically 1 hour and 45 minutes). These tests are largely a combination of true and false, multiple choice, matching, and include calculations similar to the online quizzes. Students will be allowed to use their notes during the exams. However, you should prepare for these exams as you would any other test, as you will not have time to look through your notes for every question. **Make-up exams are only given under extreme situations including technical failure and may carry up to a 10% penalty.**

**Short Response Questions (2 @ 25 points, 50 points total)**

Each timed exam will be accompanied by several untimed short response questions. The questions will be open and available in Canvas on the dates indicated in your syllabus. See the course schedule for details. Unlike the exam, they are not timed so you should be able to carefully research and compose your answers. **Late work carries a penalty up to 10% and will not be accepted more than 2 days after the scheduled due date.**

**In class quizzes (10 @ 7 points each: 70 points total)**

Each week you will take a short, in class quiz based on the previous weeks’ lecture. **There are no make-ups for missed quizzes, but you will be allowed to drop your two lowest quizzes. This includes quizzes missed due to sickness, religious observation, unfortunate life events, etc. Lowest quizzes are dropped by substituting a perfect score for two quizzes, which is mathematically more favorable for you!**

**Untimed Online Homework (10 @ 7 points each: 70 points total)**

Ten untimed, online homework assignments will become available to you on Canvas on the day it is assigned. Each homework contains up to 7 questions, which are usually worth a point each. Homework may be worked on for an unlimited amount of time before the due date and you are expected to use your notes and text. Online homework tends to focus on calculations, so you may think of these as problem sets. Do not skip questions as they will register as a zero towards your score. Your score and the correct answers to the homework will be available in the gradebook several days after the homework closes. **There is a penalty up to 10% for completing homework past the scheduled closing date, during the two day window before the answers are released to the class. It is not possible to complete a homework after the answers are released to the class or submit work late if it is the last homework prior to an exam. There are no make-ups for missed homework. I will, however, drop your lowest (including a missed) homework. This is done by adding a perfect score in its place, which is again, mathematically more favorable to you than simply omitting the points from your average.**
**MMWR Presentation (20 points)**

During Week 2 class, each student will sign up for a date throughout the semester in which they will present on an article published in that week’s Morbidity and Mortality Weekly Report (MMWR) released by the CDC. Guidelines for these presentations will be distributed in class.

**Academic Integrity**

Academic Integrity is vital to the mission of Rutgers, to education at Rutgers, and membership in the Rutgers community. It is a core value that supports trust among students, and between students and teachers. It is also a shared value; administration, faculty, and students play a vital part in promoting, securing, and nurturing it.

Academic dishonesty is not an individual act that affects only the students involved. It violates communal trust, impacts other members of the community, and is an offense against scholarship. For this reason, any instance of cheating or plagiarism will be dealt with harshly.

See the Rutgers Academic Code and Academic Oath at: [http://academicintegrity.rutgers.edu/](http://academicintegrity.rutgers.edu/)

**Attendance and Cancellation of Classes**

In accordance with Rutgers University regulations, attendance is expected at all regularly scheduled meetings of a course and individual courses may set policies for maximum absence. Please refer to the link below for more information:


**Electronic Devices**

I believe we all learn as well as teach better with fewer distractions. In general, cell phones are prohibited during class, other than for use as a calculator. Please turn off all ringers and notifications before entering the room. Laptops and tablets will be permitted provided you use them to access course content and not for iMessagining, Facebook, Twitter, any/all social media, etc. I reserve the right to ask any student to put away their electronic device at any time they are using it for purposes other than to engage in course content.

**Disaster Plan**

During cyberattacks and other disasters affecting the campus network, Canvas sets up an alternative access for students so that we may complete the semester as planned. In the event that Rutgers CAS experiences an interruption of services this semester, please make sure you have:
• Access to the internet outside of Rutgers University (such as through an off campus friend or family member. It is also freely available at Panera, Starbucks, and the public library).
• You may also need access to a laptop or other functional computer device that allows you to get online outside of Rutgers CAS. Mobile devices such as an iPhone or tablets may not be enough to complete all assignments, including exams.

In addition, please look for an email from me during the first week of class, instructing you how to best provide me with your cellphone or a non-Rutgers email.

Students with Disabilities

Rutgers University welcomes students with disabilities into all of the University’s educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: https://ods.rutgers.edu/students/registration-form. Please notify me as soon as possible if you are in the process of obtaining documentation and turn your paperwork into me at least two weeks prior to the first exam.

Privacy Statement

The course web site may contain student information that is protected by the Family Educational Rights to Privacy Act (FERPA). Disclosure to unauthorized parties violated the federal privacy laws. Email sent via our course website may make students’ names and email addresses visible to other students in class. Please remember that this information is protected by these federal privacy laws and must not be shared with anyone outside of class.

This syllabus was adapted from Dr. Amy Abruzzi’s Fall 2016 Introduction to Epidemiology hybrid course syllabus.